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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/605,688	10/17/2003	Amarendra Anumakonda	19441-0013	2687

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EXAMINER	
WARTALOWICZ, PAUL A	
ART UNIT	**PAPER NUMBER**
1754	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	12/20/2006	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/605,688	Applicant(s) ANUMAKONDA ET AL.	
	Examiner Paul A. Wartalowicz	Art Unit 1754	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 October 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-18* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-18* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anumakonda et al. (U.S. 6221280) in view of Wojtowicz et al. (U.S. 2002/0041986) and Isogaya et al. (U.S.4331451) and Metius et al. (U.S. 6602317) and Marchland et al. (U.S. 2002/0114747).

Anumakonda et al. teach a process for catalytic partial oxidation of hydrocarbon fuel (col. 7, lines 40-44) wherein feeding heavy hydrocarbons such as kerosene are reacted with an oxidizer gas in a partial oxidation reactor in the presence of a noble metal catalyst at a temperature of about 1050° C (col. 5, lines 25-44) wherein the reaction product gas mixture comprising hydrogen and carbon monoxide (col. 5, lines 45-48) is fed to a solid oxide fuel cell system (fuel cell system inherently teaches

producing electric power, col. 7, lines 1-4). Anumakonda et al. fail to teach passing a heat exchange fluid through the shell and past the at least one catalytic partial oxidation reactor with the heat exchange fluid in the shell flowing in the same direction of reactant flow in the catalytic partial oxidation reactor tube such that heat from partial oxidation in the at least one catalytic partial oxidation reactor transfers from the at least one catalytic partial oxidation reactor to the heat exchange fluid in the shell.

Wojtowicz et al. teach a process for producing hydrogen rich gas for use in a fuel cell produced from a hydrocarbonaceous material (paragraph 0019) wherein heat from an oxidation reaction is transferred for the purpose of heating an inlet stream (paragraph 0079, lines 15-24).

Isogaya et al. teach a process for catalytic gasification of heavy distillate such as a kerosene stream (col. 4, lines 5-10) wherein the temperature of the inlet must be higher than 500°C (col. 5, lines 13-15) for the purpose of preventing the deposition of carbon on the catalyst bed (col. 5, lines 15-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide heat from an oxidation reaction transferred to an inlet stream (Wojtowicz et al., paragraph 0079, lines 15-24) in Anumakonda et al. in order to prevent the deposition of carbon on the catalyst bed (Isogaya et al., col. 5, lines 15-17) as taught by Wojtowicz et al. and Isogaya et al.

As to the limitation of the heat exchange fluid in the shell flowing in the same direction of reactant flow in the catalytic partial oxidation reactor tube, Marchand et al. teach a process for converting hydrocarbon into a stream containing hydrogen

(paragraph 0001, lines 1-5) wherein a closed vessel having a reformate inlet and a reformate outlet for receiving and discharging, respectively, a reformate stream, and having a coolant inlet and a coolant outlet for receiving and discharging, respectively a coolant fluid stream (coolant fluid stream is heat-exchanger, paragraph 0065) wherein at least one passage of the heat-exchanger extends through at least a portion of the reaction chamber (paragraph 0073, lines 5-8) for the purpose of using the heat supplied by the exothermic oxidation for other parts of the reaction (paragraph 0133). Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide a closed vessel having a reformate inlet and a reformate outlet for receiving and discharging, respectively, a reformate stream, and having a coolant inlet and a coolant outlet for receiving and discharging, respectively a coolant fluid stream (coolant fluid stream is heat-exchanger, paragraph 0065) wherein at least one passage of the heat-exchanger extends through at least a portion of the reaction chamber (paragraph 0073, lines 5-8) in Anumakonda et al. in order to use the heat supplied by the exothermic oxidation for other parts of the reaction (paragraph 0133) as taught by Marchand et al.

As to the limitations regarding a plurality of catalytic partial oxidation reactors, it would be obvious to one of ordinary skill in the art to have multiple partial oxidation reactors in series, as it would have been would have been routine experimentation to determine optimum conditions for carrying out the reaction. It would have been further

obvious that multiple reactors would be in a parallel series and offset from another by a predetermined distance (reactors offset from each other).

If the limitations regarding a plurality of catalytic partial oxidation reactors are not obvious over Anumakonda et al., Metius et al. teaches that it is known to have multiple partial oxidation reactors producing hydrogen and carbon monoxide (Throughout document, particularly col. 6, lines 45-50).

Therefore, it would have been obvious to one of ordinary skill in the art at the time applicant's invention was made to provide multiple partial oxidation reactors producing hydrogen and carbon monoxide (Throughout document, particularly col. 6, lines 45-50) because it well known to have multiple partial oxidation reactors as taught by Mertius et al.

Additionally, it would have been further obvious to dispose the multiple reactors in a shell parallel to and spaced from one another such that each is offset from another as optimum operating conditions would be readily determined through routine experimentation (reactors offset from each other).

Response to Arguments

Applicant's arguments filed 10/10/06 have been fully considered but they are not persuasive.

Applicant argues that Marchland discloses a steam reforming system comprising a steam reformer wherein the coolant inlet 730 is proximate the reformer outlet 726 and the coolant outlet 732 is proximate the reformate inlet 706 and thus the coolant travels in a direction opposite the direction of the reformate flow and as a result the downstream end of the bed is significantly cooler than the front portion.

However, the embodiment cited by applicant is not limiting. Marchland also teaches that when the pre-oxidizer is replaced with a first-stage selective oxidizer, the exothermic oxidation reactions resulting from the first-stage selective oxidizer would provide heat for shift reactor (downstream of the first-stage selective oxidizer) (paragraph 0133, lines 1-9). This is evidence that Marchland does not teach away from the present invention but teaches that the limitation of the heat-exchange liquid flow in the same direction of the reactant flow is obvious to one of ordinary skill in the art at the time applicant's invention was made.

Applicant argues that Anumakonda does not disclose a plurality of catalytic partial oxidation reactors disposed in a shell parallel to and spaced from one another along the direction of feed gas mixture flow nor the limitation of passing a heat exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant flow such that heat from the reactor transfers to the heat exchange fluid.

However, Anumakonda is not relied upon to teach to teach a plurality of partial oxidation reactors nor passing heat exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant flow such that heat from the reactor transfers to the heat exchange fluid. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that nothing in Wojtowicz, Isogaya, or Marchland supplements the deficiencies of the teachings of Anumakonda.

However, Applicant's arguments fail to comply with 37 CFR 1.111(b) because they amount to a general allegation that the claims define a patentable invention without specifically pointing out how the language of the claims patentably distinguishes them from the references.

Applicant's arguments do not comply with 37 CFR 1.111(c) because they do not clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. Further, they do not show how the amendments avoid such references or objections.

Applicant argues that Isogaya teaches away from passing a heat exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant

flow, which keeps the feed gas mixture in the precatalyst zone cool and that Isogaya teaches that the inlet should be maintained at a high temperature to prevent carbon deposition.

However, that Isogaya teaches that the inlet should be maintained at a high temperature to prevent carbon deposition is not limiting in light of the present invention. This is because the temperature of the inlet is a feature not claimed. In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the temperature of the inlet) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Isogaya also teaches that the temperature of the exit bed must be at least 800 °C for the purpose of preventing carbon deposition (col. 4, lines 45-52). This is some evidence that the teaching of Isogaya does not teach away from the claimed invention and also there is motivation for the obviousness of the present invention. Wojtowicz adds to this motivation by reciting "the CO oxidizer (exothermic reaction) could be coupled with, or complemented by, a heat-recovery unit in which excess hydrogen from the *outlet* of the fuel cell" (paragraph 0079, lines 19-24).

Applicant argues that Marchland teaches away from passing a heat exchange fluid past a plurality of catalytic partial oxidation reactors in the same direction of reactant flow because Marchland teaches cooling the downstream portion of the reactor

bed with a coolant flowing in the direction opposite the reactant flow so that a higher temperature results in the upstream portion of the bed.

However, Marchland also teaches that when the pre-oxidizer is replaced with a first-stage selective oxidizer, the exothermic oxidation reactions resulting from the first-stage selective oxidizer would provide heat for shift reactor (downstream of the first-stage selective oxidizer) (paragraph 0133, lines 1-9). This is evidence that Marchland does not teach away from the present invention but teaches that the limitation of the heat-exchange liquid flow in the same direction of the reactant flow is obvious to one of ordinary skill in the art at the time applicant's invention was made.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul A. Wartalowicz whose telephone number is (571) 272-5957. The examiner can normally be reached on 8:30-6 M-Th and 8:30-5 on Alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Paul Wartalowicz
December 11, 2006

Steven Bos
A.U. 1754
Primary Examiner